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Evoking Teachers' Innovative Work Behavior: Perspective of Digital Leadership, Creativity, and Proactive Personality Through Work Engagement

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Abstract: This study aims to investigate the effect of digital leadership, creativity, and proactive personality on innovative work behavior (IWB) through work engagement. The research involved 436 private school teachers in Indonesia. The research data were collected by a Likert scale questionnaire. Data analysis is done using structural equation modeling based on Partial Least Squares (SEM-PLS), with descriptive and correlational analysis as supplements. The findings indicated that digital leadership, creativity, proactive personality, and work engagement affect teacher IWB; digital leadership, creativity, and proactive personality impact teacher work engagement; and digital leadership, creativity, and proactive personality affect teacher IWB through work engagement. These findings introduce a new empirical model of the influence of digital leadership, creativity, and proactive personalities on teachers' IWB through work engagement. This model deserves to be discussed critically and in-depth, and adapted and adopted by researchers to enrich their future research. This model can also be modified and adopted by school practitioners (management) to accelerate and optimize teachers' IWB capacity based on digital leadership, creativity, proactive personality, and work engagement.

Keywords: Creativity, digital leadership, innovative work behavior, proactive personality, work engagement.

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Introduction

Innovative work behavior (IWB) is a critical driver of organizational performance in today's dynamic and competitive environment. Innovation in the work environment not only encourages adaptation to technological changes but also increases organizational competitiveness (Akbar Hidayat, 2023). IWB is manifested in the intentional development, implementation, and application of fresh concepts, techniques, or products within a professional or organizational context, which empirically enhances organizational innovation and performance (Alshahrani et al., 2024; Shahbaz et al., 2024). This includes employees' ability to devise new solutions, adapt to changing demands, and effectively implement creative ideas. However, many organizations still face an innovation gap, where employees are less motivated to develop new ideas (Alkharmany et al., 2024). Empirical evidence suggests that fostering IWB is a challenge in many organizations. Phenomena such as low employee initiative, limited adoption of creative solutions, and resistance to change often hinder innovative outcomes, leading to stagnation in organizational growth and competitiveness (Noroozi et al., 2024). This phenomenon can hinder organizational growth, especially in fast-moving organizations such as technology and knowledge-based services, including school organizations (education). For instance, school organizations in Indonesia are not only busy facing the digital technology revolution, which de facto drains the mind and energy in adopting, adapting, and anticipating the negative impacts of the digital technology revolution, but also to address the challenges of digital transformation in education, which include gaps in access to infrastructure (electricity, internet, digital devices), lack of digital literacy (only about 10% of students are ready in digital literacy), teacher and student readiness to use

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technology, changes in curriculum and learning methods to suit student needs and current developments, unsecured data security and privacy, digital disruption, and resistance to change. Moreover, school management also has to respond to various actual developments that occur in the field of education. For example, when the Independent Curriculum (Kurikulum Merdeka) was implemented nationally in 2024, a new discourse on deep learning emerged as a replacement for the Independent Curriculum right now (2025). Conditions like this require an IWB. Therefore, it is crucial to explore teachers' IWBs based on the factors that influence them. At least four factors influence IWB: digital leadership, creativity, proactive personalities, and work engagement. Digital leadership is the capacity to utilize digital technology to motivate and guide people, cultivating an environment that encourages business model innovation by promoting adaptability and technological integration (Kaiyai et al., 2024; Malik et al., 2025). Creativity refers to the capability to generate original and valuable ideas, which enables employees to design new solutions to workplace challenges (Gomez, 2024; Salsabila & Mansyur, 2024). Further, a proactive personality is related to a tendency to take initiative and make changes, which encourages employees to pursue innovative actions (Mozie & Mahadi, 2024). Lastly, work engagement reflects an employee's emotional and cognitive commitment to work.

Some of this empirical evidence supports previous studies conducted by Sebetci et al. (2025), which demonstrated that digital leadership affects IWB. In addition, Y. Zhang's (2025) study also revealed that creativity has an impact on IWB. The results of recent research also report the significant role of proactive personalities in influencing IWB (Tawar & Syahrizal, 2025). Nathaniel and Dewi (2024) also claim that work engagement significantly impacts IWB. There is other empirical evidence showing, in addition to impacting IWB, that work engagement is also affected by digital leadership (Ertanto et al., 2025; Li et al., 2024), creativity (W. Zhang et al., 2020; Zhi & Wang, 2025), and proactive personality (Peng & Chen, 2023; Wong & Jonathan, 2024). This condition highlights the unique role of work engagement as a potential mediator in the causal link between digital leadership, creativity, and proactive personality with IWB. However, several other studies have results that contradict some of these findings. For example, some studies have found that work engagement did not significantly influence IWB; instead, IWB contributes to work engagement (Karafakioglu & Findikli, 2024). On the other hand, work engagement has also been shown to affect creativity (Aldabbas et al., 2023; Can et al., 2024; Kulachai, 2024). Meanwhile, the study by Zia et al. (2025) demonstrates how work engagement influences digital leadership. Some of these conflicting research results imply anomalies. According to the Theory of Planned Behavior (Ajzen, 2015), a person's intention to perform a specific behavior is the most direct predictor of that behavior. This intention is determined by the individual's attitude toward the behavior (behavioral control) and the subjective norms (perceived social pressure) surrounding the behavior. In this context, IWB (behavior) is influenced by work engagement (intention), whose existence is determined by digital leadership (subjective norm) along with creativity and proactive personality (behavioral control). Therefore, the circumstance denotes a research gap that requires scientific elucidation. Based on this urgency, this study seeks to respond to the research gap and ascertain the role of work engagement in mediating the impact of digital leadership, creativity, and proactive personality on teachers' IWB. Some of these conflicting research results imply anomalies. According to the Theory of Planned Behavior (Ajzen, 2015), a person's intention to perform a specific behavior is the most direct predictor of that behavior. This intention is determined by the individual's attitude toward the behavior (behavioral control) and the subjective norms (perceived social pressure) surrounding the behavior. In this context, IWB (behavior) is influenced by work engagement (intention), whose existence is determined by digital leadership (subjective norm) along with creativity and proactive personality (behavioral control). Therefore, the circumstance denotes a research gap that requires scientific elucidation. Based on this urgency, this study seeks to respond to the research gap and ascertain the role of work engagement in mediating the impact of digital leadership, creativity, and proactive personality on teachers' IWB.

Literature Review

IWB

Organizations that encourage IWB are more flexible, able to adapt quickly, and able to create superior products or services. Research indicates that IWB is a significant driver of innovation and business performance (Lewaherilla et al., 2024; Zehir & Öztürk, 2023). Moreover, IWB also fosters a competitive advantage within an organization (Ercantan et al., 2024). IWB denotes the intentional efforts of an individual or group to conceive, advocate for, and execute innovative ideas that improve organizational efficiency, productivity, or competitive edge (Chakim et al., 2024; Manalo et al., 2025). IWB encompasses multidimensional processes, including the exploration, creation, promotion, and implementation of ideas, which collectively serve as the micro foundation for organizational innovation (Pajuoja et al., 2025). Unlike creativity, which focuses primarily on idea generation, IWB extends to the practical application and advocacy of innovative ideas in an organizational context (Liu et al., 2023). IWB is characterized by several indicators, namely opportunity exploration, generativity, informative investigation, championing, and application (Aryani et al., 2024; Pajuoja et al., 2025).

Digital Leadership and IWB

IWB can be built with the support of various factors, one of which is digital leadership. Recent research by Ahmed et al. (2024), Al-Ayed (2024), and Zia et al. (2025) indicates that digital leadership substantially influences IWB. Digital

leadership refers to the capability of leaders to use and utilize digital technology to attain organizational strategic objectives, foster innovation, and manage the intricacies of the swiftly changing digital landscape (Büyükebeşe et al., 2022; Turan-Torun et al., 2025). Digital leadership integrates technological prowess, strategic vision, and adaptive leadership to drive digital transformation and organizational sustainability (Cheng et al., 2025). Different from conventional leadership, digital leadership focuses more on aligning digital strategies with organizational goals while promoting a culture of collaboration and innovation in response to the dynamics of Industry 4.0 (Khatri & Dutta, 2023; Siregar & Akhter, 2025). This approach requires leaders to have a deep understanding of emerging technologies and effectively apply them to improve competitiveness performance (Mollah et al., 2024). Digital leadership includes essential indicators such as the formulation of a digital vision, the empowerment of digital ecosystems, and the strategic alignment of digital initiatives (Benitez et al., 2022; Westerman et al., 2014). Collectively, these elements enable leaders to foster an environment conducive to creativity and adaptability. In several cases, digital leadership is believed to have a direct impact on IWB by providing individuals with the necessary tools, autonomy, and motivation to innovate. Leaders who demonstrate technological competence and strategic agility are better positioned to inspire and support employees in generating and implementing new ideas (Turan-Torun et al., 2025). Moreover, collaborative and empowerment-focused digital leadership creates a culture that supports and encourages risk-taking and innovation (Ordu & Nayır, 2021). In the educational context, a principal's digital leadership can potentially create a digitally rich academic environment, enabling teachers to access new resources easily and quickly. It can encourage innovative work behaviors. As a result, the first hypothesis can be expressed as follows:

H₁: Digital leadership directly impacts IWB.

Creativity and IWB

Another factor that could affect IWB is creativity. Recent studies prove that creativity significantly affects IWB (Nam & Nga, 2024; Setiyawami et al., 2023; Zaidi et al., 2024; Y. Zhang, 2025). In this context, creativity serves as an antecedent that gives rise to IWB (Suendarti et al., 2020). Creativity is the capacity to reinterpret existing knowledge, typically by recalling new information, generating novel conceptions and unique ideas, or transforming pre-existing elements into innovative constructs. Kaufman and Sternberg (2019) define creativity as the main force behind innovation, which includes the emergence of new concepts or solutions that benefit an organization (business). Creativity also reflects the mental and behavioral ability to generate new ideas, restructure pre-existing knowledge, or combine various information to produce inventive results (Corazza & Lubart, 2021).

Moshanah et al. (2024) suggest that creativity is the ability to develop new and useful ideas that can be applied effectively in an educational environment, encompassing cognitive, emotional, and social dimensions that foster problem-solving and innovative skill development. The ability to develop new strategies, leverage emerging technologies, or refine existing practices to achieve organizational goals exemplifies creativity (Miao & Cao, 2019). Creativity encompasses several key indicators, including fluency, flexibility, originality, elaboration, and redefinition (Damanik & Widodo, 2025; Moshanah et al., 2024). These indicators align with the characteristics of a teacher's job, which requires teaching, pedagogical, social, and personality competencies. In practice, these four competencies require fluency, flexibility, elaboration, and redefinition, particularly to respond to the dynamics of the learning process, which continues to change and evolve in line with the development of human civilization, science, and technology. Therefore, in reality, creativity and IWB have a close relationship, with creativity often considered the foundation or primary driver of IWB. Creativity is a prerequisite for IWB, as innovation cannot happen without new ideas generated through the creative process. As an illustration, teachers with high flexibility tend to have the opportunity to explore various problems and challenges in the field of teaching, which makes them innovative. Therefore, the second hypothesis can be offered as follows:

H₂: Creativity directly influences IWB.

Proactive Personality and IWB

Scholars also claimed that proactive personality affects IWB (Fan et al., 2022; Tekeli & Özkoç, 2022; Ullah et al., 2024). This suggests a proactive personality is necessary to stimulate IWB. Conceptually, a proactive personality is a person's tendency to take control, foresee opportunities, and positively modify their environment to realize personal and organizational goals (Aryani et al., 2025). Zahra and Kee (2022) describe a proactive personality as an individual characteristic that consistently demonstrates initiative, creativity, and the ability to anticipate changes within the organizational context. According to Wong and Jonathan (2024), a proactive personality is a characteristic of individuals who actively seek ways to improve working conditions and enhance work engagement through independent and forward-oriented actions, especially in the context of new work arrangements. Meanwhile, Mubarak et al. (2021) assert that it denotes an individual's inclination to engage in change-oriented behaviors, which directly influence innovative work behavior through personal initiative and the capacity to identify opportunities within the workplace.

Peng and Chen (2023) explain that a proactive personality is a permanent disposition that encourages individuals to act independently, anticipate customer needs, and engage in proactive behaviors that improve service performance, particularly in frontline service roles. Proactive personality indicators include self-initiative, change orientation, and

future orientation. Self-initiative is the propensity to conceive novel ideas and take action on them. Change-oriented denotes the inclination to initiate and execute modifications. Ultimately, future-oriented pertains to the inclination to channel one's life energy into anticipating future events (Aryani et al., 2025; Frese & Fay, 2001). If teachers possess these three indicators for a relatively long and stable period, it has the potential to encourage their IWB, including in carrying out teaching tasks. Therefore, the following is the third hypothesis:

H3: Proactive personality directly impacts IWB.

Work Engagement and IWB

Empirically, work engagement significantly affects IWB (e.g., Bannay et al., 2020; Barkat et al., 2024; Jason & Geetha, 2021). Work engagement denotes a favorable and fulfilling psychological condition characterized by elevated levels of energy, enthusiasm, and dedication among employees (Putra et al., 2020; Wang et al., 2024). Martínez et al. (2024) also suggest that work engagement is a mentally motivated condition that allows workers, especially teachers, to achieve success in their roles. It involves personal satisfaction, motivation, and a sense of usefulness despite obstacles such as high demands and emotional challenges. Meanwhile, Huang et al. (2022) describe work engagement as an employee's emotional, cognitive, and physical involvement in their tasks, which leads to intrinsic motivation and a commitment to achieving organizational goals. This notion emphasizes that work engagement is a construct that encourages employees to work with high energy and enthusiasm in the context of a technology-influenced work environment. In addition, work engagement refers to the motivation that employees have to be involved in and enthusiastic about their work. Engaged personnel endeavor to enhance the organization by increasing productivity, efficiency, and fostering creativity (Sari et al., 2021).

Work engagement can be measured by several indicators, among others, (1) vigor, which refers to high energy levels, mental resilience, and perseverance in facing work challenges. Employees who show enthusiasm feel enthusiastic and can work hard despite difficulties; (2) dedication, which signifies a profound sense of engagement, fervor, and pride in one's professional endeavors. Committed individuals perceive their job as significant and motivating, and (3) absorption refers to a condition where employees are entirely focused and engaged in their tasks, leading to the sensation that time elapses rapidly. Absorption shows a level of focus and deep engagement with job responsibilities (Eacock & Barber, 2022; Schaufeli & Bakker, 2010; Sonnentag, 2017). Elevated job engagement among teachers cultivates motivation and vigor, empowering people to conceive creatively and formulate inventive solutions. An emotional and cognitive commitment to his profession as a teacher compels him to actively promote and implement innovative ideas that are useful in teaching. Thus, the fourth hypothesis can be expressed as follows:

H4: Work engagement directly influences IWB.

Digital Leadership and Work Engagement

Work engagement distinctly affects IWB while simultaneously being shaped by digital leadership. Digital leadership is essential in influencing employee work engagement during the digital transformation era. Experts assert that digital leadership is significantly correlated with work engagement (e.g., Ertanto et al., 2025; Li et al., 2024; Yang et al., 2024). Furthermore, Jyoti and Kapur (2024) discovered that digital leadership fosters employees' intrinsic motivation via adaptive communication and technological empowerment. Additionally, digital leadership underscores managerial competencies in digital communication, social networking, transformation, team management, technology, and trust (Roman et al., 2019). Digital leadership encompasses several fundamental traits, such as strategic transformation, a transformative vision, a future-oriented attitude, and robust adaptability, all of which are crucial for traversing digital frontiers (Weber et al., 2022; Zhu et al., 2022). If under favorable conditions, these traits can encourage teacher work engagement, which is reflected in high enthusiasm and dedication to teaching or to other roles in the school. Therefore, the following is an expression of the fifth hypothesis:

H5: Digital leadership directly impacts work engagement.

Creativity and Work Engagement

Creativity also significantly affects work engagement. The research by W. Zhang et al. (2020) and Zhi and Wang (2025) reveals that creativity significantly contributes to increasing work engagement. Other recent studies also prove the significant role of creativity in stimulating work engagement (Wirawan et al., 2024; Wu et al., 2025). Conceptually, creativity is concerned with the production of ideas or outcomes that vary in their combination of novelty and usefulness (Harvey & Berry, 2023).

Y. Zhang (2025) highlights fluency, originality, flexibility in problem-solving, and practical relevance as key aspects of creativity. In a similar vein, Damanik and Widodo (2025) and Moshanah et al. (2024) suggest that the following indicators—fluency, flexibility, originality, elaboration, and redefinition—can be used to quantify creativity. If teachers are in adequate, solid, and consistent conditions, these indicators can trigger and spur their work engagement, which is manifested in enthusiasm, dedication, and absorption of poor working conditions, such as students with learning

difficulties, students with low achievement, or schools with limited learning facilities and media. Hence, it is not an exaggeration to propose the sixth hypothesis:

H₆: Creativity directly affects work engagement.

Proactive Personality and Work Engagement

A proactive personality also correlates with work engagement. Numerous prior studies have indicated the significant impact of proactive personalities on work engagement (e.g., Nerissa & Rachmawati, 2024; Peng & Chen, 2023; Wong & Jonathan, 2024). It is suggested that a proactive personality is crucial for work engagement. Consequently, the exceptional qualities of a proactive personality among teachers, including self-initiative, change-orientedness, and future-orientedness, are likely to foster more robust work engagement that is reflected in high energy levels, mental resilience, perseverance in the face of work challenges, sense of involvement, enthusiasm, pride in work, and full concentration for tasks/jobs in the schools. This leads us to the following promotion of the seventh hypothesis:

H₇: Proactive personality directly affects work engagement.

Mediation Mechanism of Work Engagement

The aforementioned studies' results suggest that work engagement serves as a mediator. One side of the coin is that digital leadership affects employee engagement (e.g., Ertanto et al., 2025; Li et al., 2024), creativity (e.g., Wu et al., 2025; Zhi & Wang, 2025), and proactive personalities (e.g., Nerissa & Rachmawati, 2024; Wong & Jonathan, 2024); while on the other side, work engagement affects IWB (e.g., Barkat et al., 2024). The position of work engagement, which lies between digital leadership, creativity, proactive personality, and IWB, indicates the function of mediation. Nonetheless, prior research that particularly investigates the role of work engagement meditation has proven difficult to locate, primarily in education (school). It underscores the necessity for more exploration in this area. In light of this urgency, the subsequent hypotheses may be proposed:

H₈: Digital leadership indirectly influences IWB through work engagement.

H₉: Creativity indirectly affects IWB through work engagement.

H₁₀: Proactive personality indirectly influences IWB through work engagement.

Based on the theoretical description and research hypothesis above, two substructures can be constructed. First, the influence of digital leadership, creativity, proactive personality, and work engagement on IWB. Second, the influence of digital leadership, creativity, and proactive personality on work engagement. Furthermore, the role of work engagement as a mediator in the causal relationship between digital leadership, creativity, and proactive personality with IWB is also evident. Based on these conditions, a theoretical model or conceptual research framework can be developed, which can be visualized as follows:

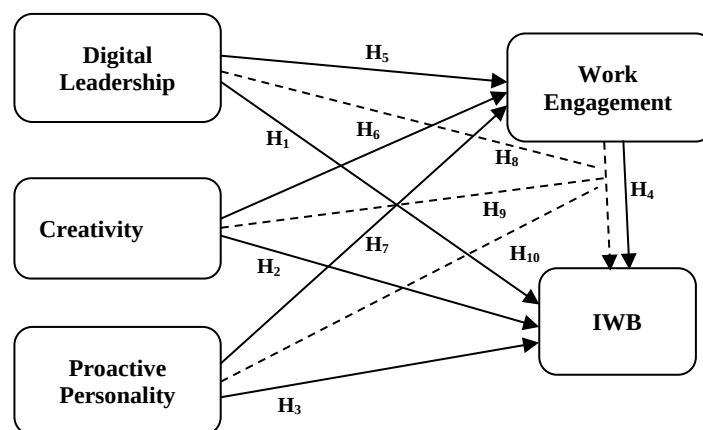


Figure 1. Research Conceptual Framework

Methodology

Research Approach and Design

This research employs a quantitative approach grounded in a positivistic view, which emphasizes knowledge based on empirical experience and observed facts (Neuman, 2021). The goal is to describe and explain the correlation between variables. Each research variable is objectively described, allowing for the observation of its impact on another using data, facts, or information collected through surveys (McMillan & Schumacher, 2013). In this case, the study uses a cross-sectional survey analyzed with a partial least squares-based structural equation model (PLS-SEM). The goal is to find the link between exogenous variables (digital leadership, creativity, and a proactive personality) and endogenous variables (work engagement and IWB)

Participants

This study's sample (participants) consisted of 436 private school teachers from three provinces in Indonesia. They comprised 94.7% of the 460 teachers who completed the questionnaire. They came from 24 junior high schools (eight schools per province), nine senior high schools (three schools per province), and three vocational high schools (one school per province). They were aged between 22 and 60 years old. Sampling was conducted using incidental sampling based on the respondents' willingness to voluntarily complete questionnaires during the study (Widodo, 2018). As shown in Table 1, the majority of the samples reside in West Java Province (39.68%), female (59.63%), aged 26-35 years (31.19%), the last education of Bachelor/S1 (86.93%), married (77.06%), and the teaching experience is less than or equal to 5 years (31.42%).

Table 1. Research Participants Profile

Characteristics	Frequency	Percentage (%)
Province		
1. Jakarta	129	29,59
2. West Java	173	39,68
3. Banten	134	30,73
Gender		
1. Male	176	40,37
2. Female	260	59,63
Age		
1. ≤ 25 years	64	14,68
2. 26 – 35 years	136	31,19
3. 36 – 45 years	120	27,52
4. 46 – 55 years	97	22,25
5. > 55 years	19	4,36
Education		
1. Diploma	10	2,29
2. Bachelor (S1)	379	86,93
3. Magister (S2)	47	10,78
Status		
1. Married	336	77,06
2. Unmarried	100	22,94
Teaching experience		
1. ≤ 5 years	137	31,42
2. 6 – 10 years	116	26,61
3. 11 – 15 years	125	28,67
4. > 15 years	58	13,30

Procedures and Materials

This study uses a survey method, which focuses on research with large and small populations, using carefully selected samples to determine the relative occurrence, distribution, and correlation between variables (Widodo, 2018). The survey was conducted using a Likert scale questionnaire with five answer choices, ranging from strongly disagree (score 1) to strongly agree (score 5). The questionnaire was compiled by the researcher himself, based on indicators provided by experts. The questionnaire is designed in Google Form format and is distributed through email and WhatsApp applications.

Indicators of digital leadership include digital vision development, data-driven decision-making, digital agility culture, digital ecosystem empowerment, strategic digital alignment, and digital risk management (Benitez et al., 2022; Vial, 2019; Westerman et al., 2014). Proactive personality indicators consist of self-initiative, change-oriented, and future-

oriented (Aryani et al., 2025; Frese & Fay, 2001). Creativity's indicators, such as fluency, flexibility, originality, elaboration, and redefinition (Damanik & Widodo, 2025; Moshanah et al., 2024). Work engagement indicators comprise vigor, dedication, and absorption (Schaufeli & Bakker, 2010; Sonnentag, 2017). Finally, IWB indicators include opportunity exploration, generativity, informative investigation, championing, and application (Aryani et al., 2024; Pajuoja et al., 2025). Digital leadership, creativity, proactive personality, work engagement, and IWB each consist of twelve, ten, nine, nine, and ten items. Before being used to collect data, these items were tested on 30 teachers to determine their validity and reliability. Overall, their correlation coefficients range between .422 and .851; Cronbach's alpha coefficient is .813 – .891. All items possess correlation coefficients exceeding .361 and alpha coefficients surpassing .70, signifying their validity and reliability (Widodo, 2018), thus rendering them appropriate for compiling research data.

This study also includes a common method bias (CMB) test. This is undertaken because several academics hypothesize that cross-sectional survey research, utilizing self-report questionnaires such as the one applied in this study, may result in an issue of common method bias (CMB). A source of mistake in CMB measurement is the divergence between the apparent association and the true correlation resulting from common method variance (Bastian & Widodo, 2024). According to Kock (2021), a Harman's single factor test value below the .50 tolerance threshold, as found in this study .474, does not indicate data bias. Therefore, this study's data is free from data bias, ensuring its results are unquestionable.

Data Analysis

The data analysis employs the PLS-SEM, supplemented by descriptive and correlational statistical analyses. PLS-SEM analysis is used to test hypotheses and assess model suitability, while descriptive and correlational analyses are used to describe variable conditions and relationships between variables. PLS-SEM utilizes the SmartPLS 4.0 application, whereas descriptive and correlational analysis employ the SPSS application version 26.

Results

Descriptive and Correlational Analysis

Based on the results of descriptive statistical analysis, an overview of the characteristics of each variable in this study was obtained. The digital leadership variable has an average value (mean) of 50,280 with a standard deviation (SD) of 6,754. The data distribution tends to be skewed to the left (Skewness = -0.906) and has a sharper peak (Leptokurtic) compared to the normal distribution (Kurtosis = 2.937). The creativity variable shows a mean = 42,594 and SD = 4,386 with a distribution close to normal, marked by a skewness value of 0.235 and a kurtosis of -0.791 (Platykurtic). Furthermore, proactive personality has a mean value = 38,220 and SD = 4,203, with a data distribution that is also relatively normal (Skewness = 0.178; Kurtosis = -0.703). The work engagement variable's mean value = 38.261 and SD = 4.458, with a left-skewed distribution (Skewness = -0.531) and kurtosis approaching normal (0.392). Finally, the IWB variable has the second-highest mean, namely 41.828 and SD = 5.035, with an almost symmetrical distribution (Skewness = 0.173) and tends to be flat (Kurtosis = -0.492).

The results of the correlation analysis showed a positive and significant relationship between all variables studied. Digital leadership showed a significant correlation with creativity ($r = 0.425, p < 0.01$), proactive personality ($r = 0.366, p < 0.01$), work engagement ($r = 0.353, p < 0.01$), and IWB ($r = 0.455, p < 0.01$). Stronger relationships were observed between psychological and behavioral variables. Creativity had a robust correlation with proactive personality ($r = 0.727, p < 0.01$) and IWB ($r = 0.696, p < 0.01$), as well as a strong correlation with work engagement ($r = 0.540, p < 0.01$). Similarly, proactive personality correlated strongly with work engagement ($r = 0.560, p < .01$) and IWB ($r = 0.675, p < 0.01$). Work engagement also strongly correlated with IWB ($r = 0.640, p < 0.01$). Overall, these results indicate that individuals with proactive personalities tend to have higher levels of creativity, work engagement, and IWB. Furthermore, digital leadership also showed a significant, albeit more moderate, contribution to all outcome variables in this study.

Table 2. The Results of Descriptive, Skewness, Kurtosis, and Correlational Analysis

Variables	Mean	SD	Skewness	Kurtosis	1	2	3	4
1. Digital leadership	50.280	6.754	-0.906	2.937	1			
2. Creativity	42.594	4.386	0.235	-0.791	0.425**	1		
3. Proactive personality	38.220	4.203	0.178	-0.703	0.366**	0.727**	1	
4. Work engagement	38.261	4.458	-0.531	0.392	0.353**	0.540**	0.560**	1
5. IWB	41.828	5.035	0.173	-0.492	0.455**	0.696**	0.675**	0.640**

** $p < .01$

Measurement Model

The outer model measurement test was implemented to evaluate the indicators' reliability and validity. It indicates convergent validity by examining the correlation between the indicator score and the concept (construct). In general, the loading factor should be above 0.70, while Cronbach's Alpha (CA) and Composite Reliability (CR) must also be greater than .70, and the Average Variance Extracted (AVE) must exceed 0.50 (Hair Jr. et al., 2019). Overall, the loading factor value of each indicator for all constructs (variables) (digital leadership, creativity, proactive personality, work engagement, and IWB) met the criteria for convergent validity, as they were all greater than .70, with a range of .728 – .917. At the wheel, all variables have a CA and CR value of > .70, with a range of CA of .785 – .948 and CR of .793 – .949, as well as an AVE value of > .50, with a range of .660 – .794. Thus, the convergent validity is shown to be met by all latent variables in the estimation model (Hair Jr. et al., 2019; Widodo et al., 2024).

Table 3. Measurement Model Results

Variables	Indicators	Factor Loading	CA	CR	AVE
Digital leadership	1. Digital vision development	0.876	0.948	0.949	0.794
	2. Data-driven decision-making	0.845			
	3. Digital agility culture	0.897			
	4. Digital ecosystem empowerment	0.903			
	5. Strategic digital alignment	0.913			
	6. Digital risk management	0.911			
Creativity	1. Fluency	0.728	0.870	0.878	0.660
	2. Flexibility	0.763			
	3. Originality	0.861			
	4. Elaboration	0.851			
	5. Redefinition	0.848			
Proactive personality	1. Consists of self-initiative	0.878	0.862	0.865	0.783
	2. Change-oriented	0.900			
	3. Future-oriented	0.878			
Work engagement	1. Vigor	0.852	0.785	0.793	0.699
	2. Dedication	0.861			
	3. Absorption	0.794			
IWB	1. Exploration of opportunities	0.884	0.932	0.933	0.786
	2. Generativity	0.917			
	3. Informative investigation	0.894			
	4. Championing	0.859			
	5. Application	0.877			

Goodness of Fit

This study evaluated the fit model using three test models: standardized root mean square residual (SRMR) ≤ 0.08 (Hair Jr. et al., 2023). The results of the fit model test showed that the SRMR value (0.044) was less than 0.08. The results show that the model fits the data well. This means that the study's data-driven empirical model is consistent with its theoretically proposed model.

Table 4. HTMT and Fornel Lecker Test Results

Variables	1	2	3	4	5
1. Digital leadership (X ₁)	0.891	0.467*	0.405*	0.410*	0.483*
2. Creativity (X ₂)	0.426	0.812	0.842*	0.656*	0.775*
3. Proactive personality (X ₃)	0.369	0.732	0.855	0.684*	0.755*
4. Work engagement (Y ₁)	0.356	0.546	0.567	0.836	0.752*
5. IWB (Y ₂)	0.454	0.702	0.679	0.646	0.887

* HTMT

Based on the results of the Fornel Lecker test, as shown in Table 4, the correlation between variables is greater than the variable itself compared to other variables. It can be seen that the correlation of FL digital leadership (0.891) is greater than all its correlations with other constructs (.426, .369, .356, .454). The correlation of FL creativity (.812) is also greater than all its correlations with other constructs (.426, .732, .546, .702). Likewise, the correlation of FL proactive personality (.855) is greater than all its correlations with other constructs (.369, .732, .567, .679). Similarly, the correlation of FL work engagement (.836) is also greater than all its correlations with other constructs (.356, .546, .567, .646). Finally, the correlation of FL IWB (.887) is also greater than all its correlations with other constructs (0.454, 0.702, 0.679, 0.646).

Thus, this model perfectly meets the Fornell-Larcker discriminant validity criteria. Each construct shows a stronger relationship with its own indicators than with other constructs in the model.

Furthermore, discriminant validity can also be tested using the HTMT. Hair Jr. et al. (2023) recommend an HTMT threshold of 0.90 to ensure that two constructs are empirically distinct. The HTMT test results show that all HTMT values (*) are less than 0.9. This finding further confirms the results of the Fornell-Larcker test. An HTMT value below the 0.90 threshold provides strong evidence that no serious multicollinearity problems exist between the latent constructs and that each construct is a distinct and unique measurement entity. Although some correlations between constructs are pretty high (e.g., the correlation between creativity and proactive personality = 0.732), an HTMT value below 0.9 confirms that, from a measurement perspective, the two constructs are still distinguishable from each other.

Thus, it can be concluded that the measurement model consisting of these five constructs meets excellent psychometric requirements (Hair Jr. et al., 2023). The fulfilled discriminant validity, which was confirmed by two different tests (Fornell-Larcker Criterion and HTMT), ensures that all latent variables in this study are measured accurately and do not overlap, so that the results of the analysis of the relationship between variables (as in the structural model) are reliable and free from bias.

Hypothesis Testing

With the bootstrapping approach as summarized in Table 5, all direct influence hypotheses (H₁ to H₇) were statistically significant (supported) at the alpha level $p < 0.05$, with T-statistics > 1.96 . The four exogenous variables, digital leadership, creativity, proactive personality, and job engagement, positively and significantly influenced IWB. The most significant influence was shown by creativity ($\beta = 0.314, p < .000$), followed by work engagement ($\beta = 0.296, p < .000$), proactive personality ($\beta = 0.234, p < .000$), and digital leadership ($\beta = 0.129, p < .000$). Then, the three antecedent variables, digital leadership, creativity, and proactive personality, also significantly influenced work engagement. The most decisive influence comes from proactive personality ($\beta = 0.346, p < 0.000$), followed by creativity ($\beta = 0.238, p < .000$), and digital leadership ($\beta = 0.127, p < .000$). The test results for indirect effects (H₈, H₉, H₁₀) also show significant results, with t -statistic values > 1.96 and p values $p < .000$. It proves that work engagement acts as a partial mediator in the relationship. Digital leadership, creativity, and proactive personality significantly influence IWB through work engagement ($\beta = 0.038, p = .006$; $\beta = 0.071, p < .000$; $\beta = 0.102, p < .000$).

The f^2 (effect size) value can be seen to assess each variable's relative contribution. Based on Hair Jr. et al.'s (2023) criteria, f^2 values of around 0.02, 0.15, and 0.35 indicate small, medium, and large effects, respectively. In this model, the most significant effects on IWB come from work engagement ($f^2 = 0.148$, medium) and creativity ($f^2 = 0.111$, small-medium). Meanwhile, the effects of digital leadership variables on IWB and work engagement are relatively small, with f^2 values of 0.036 and 0.021, respectively. Furthermore, all Variance Inflation Factor (VIF) values are below the threshold of 3.0 (even below 2.5), indicating no interfering multicollinearity problems in this structural model (Sarstedt et al., 2022).

The R^2 (R-Squared) value for the endogenous variable IWB is 0.629. It indicates that combining digital leadership, creativity, proactive personality, and work engagement variables can explain 62.9% of the variance in IWB. Meanwhile, the work engagement variable has an R^2 value of 0.372, meaning that the digital leadership, creativity, and proactive personality variables can explain 37.2% of the variance. According to Hair Jr. et al.'s (2023) criteria, an R^2 value of 0.629 for IWB can be categorized as substantial predictive power, and 0.372 for work engagement is categorized as moderate. Furthermore, the Q^2 (predictive relevance) value for IWB is 0.565, and for work engagement is 0.361. Both of these values are well above zero, so the model has good predictive relevance, meaning the model can make predictions on new data.

Table 5. Structural Model Assessment

Hypothesis	Path Coefficient	t -Statistics	p -Value	Decision	VIF	f^2	R^2	Q^2
H1: Digital leadership affects IWB	0.129	3.606	.000	Supported	1.258	0.036	0.629	0.565
H2: Creativity affects IWB.	0.314	6.327	.000	Supported	2.384	0.111		
H3: Proactive personality affects IWB.	0.234	4.638	.000	Supported	2.364	0.062		
H4: Work engagement affects IWB.	0.296	6.882	.001	Supported	1.591	0.148	0.372	0.361
H5: Digital leadership affects work engagement	0.127	3.198	.000	Supported	1.232	0.021		
H6: Creativity affects work engagement	0.238	4.516	.000	Supported	2.294	0.039		

Table 5. Continued

Hypothesis	Path Coefficient	<i>t</i> -Statistics	<i>p</i> -Value	Decision	VIF	<i>f</i> ²	<i>R</i> ²	<i>Q</i> ²
H ₇ : Proactive personality affects work engagement	0.346	6.666	.000	Supported	2.173	0.088		
H ₈ : Digital leadership affects IWB through work engagement	0.038	2.741	.006	Supported	-	-	-	-
H ₉ : Creativity affects IWB through work engagement	0.071	4.029	.000	Supported	-	-	-	-
H ₁₀ : Proactive personality influences IWB through work engagement	0.102	4.612	.000	Supported	-	-	-	-

** $p < .01$, * $p < 0.05$

Additionally, the results of the direct and indirect influences above also reveal the total effect. The total effect of a structural model is the sum of the direct and indirect effects of an antecedent construct on an outcome (Hair Jr. et al., 2023). The total effects of digital leadership, creativity, and proactive personality on IWB through work engagement are 0.205, 0.456, and 0.438, respectively. The most considerable total effect is creativity, indicating that creativity has a more dominant total effect than the others; thus, its existence deserves more attention in improving IWB through work engagement.

Discussion

In general, this study indicated that job engagement had a significant role in buffering the impact of proactive personality, creativity, and digital leadership on IWB. This finding is in accordance with the Theory of Planned Behavior (Ajzen, 2015), which states that behavior (IWB) is caused by subjective norms (digital leadership) and behavioral control (creativity and proactive personality) through intention (work engagement).

In particular, IWB is significantly impacted by digital leadership. It demonstrates that a key factor influencing IWB is digital leadership. Consequently, when digital leadership is applied massively and effectively in schools, it can stimulate teachers' IWB. As an illustration, school principals who practice leadership are oriented towards the development of digital vision, data-based decision-making, digital culture, digital ecosystem empowerment, and strategic digital alignment by considering digital risk management, which encourages teachers to actively explore opportunities, investigate information carefully, and fight and apply new ideas to win every opportunity. These findings corroborate and validate prior research, indicating that digital leadership significantly influences IWB (Ahmed et al., 2024; Al-Ayed, 2024; Zia et al., 2025). It also aligns with several research results in the educational context among teachers and lecturers (Hadi et al., 2024; Susanti & Ardi, 2022). It provides more convincing evidence regarding the causal relationship between digital leadership and IWB.

This research also demonstrates the substantial impact of creativity on IWB. It emphasizes that creativity is a precursor to IWB; therefore, if creativity is developed, IWB will also grow in tandem with the development of creativity. For example, teachers' flexibility in responding to curriculum changes can stimulate them to seek the latest information related to the new curriculum. Teachers' fluency in thinking will also encourage them to explore and fight for opportunities that promise school progress. These findings align with prior research that has demonstrated a substantial correlation between creativity and IWB (Nam & Nga, 2024; Zaidi et al., 2024; Y. Zhang, 2025). It is also similar to prior studies in the educational context, primarily among teachers (Gunawan & Widodo, 2021; Suendarti et al., 2020). This empirical fact further emphasizes the crucial role of creativity for IWB, including teachers.

The study also reported a causal relationship between proactive personality and IWB. The relationship is linear and positive, suggesting that the more proactive an individual's personality is, the higher the IWB is likely to be. Specifically, when teachers are rich in initiative, change-oriented, and future-oriented, their capacity to explore opportunities and advocate for and implement innovative ideas will be enhanced. These findings align with and are consistent with previous studies, which claim that proactive personalities have a significant association with IWB (e.g., Ullah et al., 2024), including in the educational area, such as among students, teachers, and lecturers (Aryani et al., 2025; Ghorbani & Bay, 2025; Yeap, 2024). This empirical evidence further strengthens the position of proactive personality as a predictor of IWB.

Additionally, this investigation also disclosed that work engagement played a substantial role in IWB. It shows that work engagement is a predisposition for IWB, so if vital aspects of work engagement, such as enthusiasm and dedication, are

ignited, it can awaken IWB teachers, who are interested in exploring opportunities, investigating necessary information, and fighting for and applying new ideas that are seen as promising for educational progress. These results are consistent with prior research that has shown a substantial impact of work engagement on IWB (Barkat et al., 2024; Jason & Geetha, 2021), including among teachers and faculty members (Hassan et al., 2024; Zargar et al., 2025). They also contradict research results that suggest IWB affects work engagement (Karafakioglu & Findikli, 2024). This empirical evidence further strengthens the role of work engagement in building a better IWB.

Furthermore, this study also reveals the other side of the work engagement position. Work engagement not only affects IWB but is also influenced by digital leadership, creativity, and proactive personality. Previous research by Li et al. (2024), Ertanto et al. (2025), and Yang et al. (2024) demonstrates that digital leadership significantly influences job engagement. These results corroborate prior research. Nonetheless, it dismissed the findings of alternative research conducted by Zia et al. (2025), which indicates that work engagement adversely affects digital leadership. Creativity has been shown to have a beneficial effect on work engagement. This finding aligns with the research of W. Zhang et al. (2020) and Zhi and Wang (2025) but contradicts other studies that assert work involvement significantly influences creativity (Aldabbas et al., 2023; Can et al., 2024; Kulachai, 2024). A proactive personality has a significant influence on work engagement. These empirical findings align with and confirm previous studies that have demonstrated the role of proactive personalities in fostering work engagement (e.g., Nerissa & Rachmawati, 2024; Wong & Jonathan, 2024). Thus, this empirical evidence confirms the crucial role of digital leadership, creativity, and proactive personality in work engagement, and at the same time, shows that when these qualities are developed intensely and sustainably, they have the potential to increase teachers' work engagement.

Finally, this study's results disclose novel empirical insights into the impact of digital leadership, creativity, and proactive personality on teachers' IWB, mediated by work engagement. These findings confirm that work engagement mediates the relationship between digital leadership, creativity, and proactive personality in influencing teacher IWB, while corroborating prior partial research indicating the effects of digital leadership, creativity, and proactive personality on work engagement and the subsequent impact of work engagement on teacher IWB. This study's findings yield a novel empirical model illustrating the impact of digital leadership, creativity, and proactive personality on teachers' IWB via work engagement.

Conclusion

This research focuses on teachers' IWBs as a crucial aspect of the educational landscape. The results indicated that digital leadership, creativity, proactive personality, and work engagement affect teacher IWB; digital leadership, creativity, and proactive personality impact teacher work engagement; and digital leadership, creativity, and proactive personality affect teacher IWB through work engagement. This evidence provides new insights regarding the impact of digital leadership, creativity, and proactive personalities on teachers' IWB via work engagement. Although a relatively limited sample was determined based on accidental sampling and a specific design, it is worthy of critical and in-depth discussion. Researchers can adapt and adopt it to enrich their work in the future, and provide insight for school practitioners (management) to accelerate and optimize teachers' IWB based on digital leadership, creativity, proactive personalities, and work engagement.

Recommendations

This study provides recommendations in two areas. First, in theoretical contributions to the cluster of educational sciences, including management and educational psychology, especially those attached to the causal relationship between digital leadership, creativity, and proactive personality with teachers' IWB through the mediation mechanism of work engagement in the school context. Therefore, researchers and academics must examine the model critically, deeply, and comprehensively to develop it further with a broader spectrum, for example, with more samples among teachers, add several different locations, and provide more exhaustive coverage in more provinces in Indonesia. Second, in terms of practical implications for implementing education in schools, especially to accelerate and optimize the capacity of teachers' IWB in Indonesia based on digital leadership, creativity, proactive personality, and work engagement. Therefore, school leaders (management) in Indonesia can issue strategic policies for this, for instance, by carrying out training activities, workshops, counseling, or sharing sessions on digital leadership, creativity, proactive personality, and work engagement by inviting instructors who are experts in their respective fields. Digital leadership training is important to increase school leaders' knowledge, insight, and skills so that they are more familiar with various digital technologies and can use them to advance schools by improving teachers' IWBs. Workshops and counseling for teachers are also important to develop their creativity, proactive personality, and work engagement so that they can contribute to improving their IWB. Of note is that creativity had the most decisive influence on IWB and proactive personality on work engagement compared to the others. This indicates that creativity and proactive personality should be prioritized in improving teacher IWB and work engagement.

Limitations

This research has several limitations. First, it uses only a single data source (teacher). Second, it does not accommodate all theoretical indicators of every construct found in the literature. Third, it does not estimate control variables that may

interfere with the study's results. Fourth, it relies only on the SEM-PLS analytical approach. Future research would be better if it could eliminate these limitations, for example, by using multiple participants (teachers/peers/principals), employing longitudinal or panel data, controlling for school-level factors, and utilizing other approaches, such as covariance-based structural equation modeling.

Ethics Statements

This article was written according to the academic ethics requirements established by the Academic Ethics Committee of the Postgraduate School of Indraprasta PGRI University, Jakarta, Indonesia, Code: 6-A Number: 154A/WD/FPs/UNINDRA/V1/2025. The research data used in this study received respondents' approval for publication.

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Siregar: Conceptualization, editing, supervision, final manuscript. Widodo – Research design, statistical analysis, interpretation, drafting the manuscript. Permana: Data acquisition, funding, and administration. Sriyono: Conceptualization, data acquisition. Saputro: Data acquisition, funding.

References

- Ahmed, F., Naqshbandi, M. M., Waheed, M., & Ain, N. u. (2024). Digital leadership and innovative work behavior: Impact of LMX, learning orientation and innovation capabilities. *Management Decision*, 62(11), 3607-3632. <https://doi.org/10.1108/MD-04-2023-0654>
- Ajzen, I. (2015). Consumer attitudes and behavior: The theory of planned behavior applied to food consumption decisions. *Italian Review of Agricultural Economics*, 70(2), 121-138. <https://doi.org/10.13128/REA-18003>
- Akbar Hidayat, W. G. P. (2023). Innovation in human resource management to create a better work environment and contribute to organizational success: A systematic literature review. *Open Access Indonesia Journal of Social Sciences*, 6(6), 1176-1184. <https://doi.org/10.37275/oaijs.v6i6.188>
- Al-Ayed, S. (2024). Green innovation influenced by employee Innovative work behavior via moderating role of innovative leaderships. *Cogent Business and Management*, 11(1), Article 2393741. <https://doi.org/10.1080/23311975.2024.2393741>
- Aldabbas, H., Pinnington, A., Lahrech, A., & Blaique, L. (2023). Extrinsic rewards for employee creativity? The role of perceived organisational support, work engagement and intrinsic motivation. *International Journal of Innovation Science*, 17(2), 237-260. <https://doi.org/10.1108/IJIS-08-2022-0165>
- Alkharmany, A., Abdelhamid, A. R., & Elnokrashy, O. M. (2024). Impact of organizational inertia on employee innovative behavior. *Raya International Journal of Business Science*, 3(11), 2343-2384. <https://doi.org/10.21608/rijs.2024.339133.1229>
- Alshahrani, I., Al-Jayyousi, O., Aldhmour, F., & Alderaan, T. (2024). Towards understanding the influence of innovative work behavior on healthcare organizations' performance: The mediating role of transformational leaders. *Arab Gulf Journal of Scientific Research*, 42(1), 198-216. <https://doi.org/10.1108/AGJSR-09-2022-0167>
- Aryani, R., Bastian, A., Widodo, W., & Saragih, A. C. U. R. P. (2025). How proactive personality affects lecturer innovative behavior: A mediation perspective. *Problems and Perspectives in Management*, 23(2), 342-356. [https://doi.org/10.21511/ppm.23\(2\).2025.24](https://doi.org/10.21511/ppm.23(2).2025.24)

- Aryani, R., Widodo, W., & Susila, S. (2024). Model for social intelligence and teachers' innovative work behavior: Serial mediation. *Cogent Education*, 11(1), Article 2312028. <https://doi.org/10.1080/2331186X.2024.2312028>
- Bannay, D. F., Hadi, M. J., & Amanah, A. A. (2020). The impact of inclusive leadership behaviors on innovative workplace behavior with an emphasis on the mediating role of work engagement. *Problems and Perspectives in Management*, 18(3), 479-491. [https://doi.org/10.21511/PPM.18\(3\).2020.39](https://doi.org/10.21511/PPM.18(3).2020.39)
- Barkat, W., Waris, I., Ahmed, R., & Dad, M. (2024). Transformational leadership and frontline managers work engagement, innovative work behavior, organizational citizenship behavior, and employee sustainability in the hotel industry in Pakistan. *Journal of Human Resources in Hospitality and Tourism*, 23(2), 315-336. <https://doi.org/10.1080/15332845.2024.2282217>
- Bastian, A., & Widodo, W. (2024). Evoking teacher's professional commitment: Exploring interpersonal communication in transmitting emotional intelligence and psychological capital. *Cogent Education*, 11(1), Article 2418786. <https://doi.org/10.1080/2331186X.2024.2418786>
- Benitez, J., Arenas, A., Castillo, A., & Esteves, J. (2022). Impact of digital leadership capability on innovation performance: The role of platform digitization capability. *Information & Management*, 59(2), Article 103590. <https://doi.org/10.1016/j.im.2022.103590>
- Büyükbese, T., Dikbaş, T., Klein, M., & Batuk Ünlü, S. (2022). A study on digital leadership scale (DLS) development. *Kahramanmaraş Sütçü İmam Üniversitesi Sosyal Bilimler Dergisi*, 19(2), 740-760. <https://doi.org/10.33437/ksusbd.1135540>
- Can, Ü., Kiliçalp, M., & Akyürek, S. (2024). The role of service innovation and work engagement on creativity and training-learning effort. *International Journal of Hospitality and Tourism Administration*, 26(2), 425-455. <https://doi.org/10.1080/15256480.2024.2321568>
- Chakim, M. H. R., Utami, R. T., Sitanggang, T. W., Tanjung, A., Rizky, A., & Beldiq, E. A. (2024). Innovation behavior research: Global trends and emerging themes in entrepreneurial business practices. *Aptisi Transactions on Technopreneurship (ATT)*, 6(3), 574-585. <https://doi.org/10.34306/att.v6i3.476>
- Cheng, Z., Jin, X., & Kwak, W. J. (2025). Using the new positive aspect of digital leadership to improve organizational sustainability: Testing moderated mediation model. *Acta Psychologica*, 255, Article 104963. <https://doi.org/10.1016/j.actpsy.2025.104963>
- Corazza, G. E., & Lubart, T. (2021). Intelligence and creativity: Mapping constructs on the space-time continuum. *Journal of Intelligence*, 9(1), Article 1. <https://doi.org/10.3390/jintelligence9010001>
- Damanik, J., & Widodo, W. (2025). The effect of psychological capital, digital literacy, and knowledge management on teacher instructional quality through teaching creativity. *TEM Journal*, 14(1), 887-899. <https://doi.org/10.18421/TEM141-78>
- Eacock, G., & Barber, L. (2022). *The science of assessing and cultivating work engagement in organizations*. Routledge. <https://doi.org/10.4324/9780367198459-REPRW214-1>
- Ercantan, K., Eyupoglu, Ş. Z., & Ercantan, Ö. (2024). The entrepreneurial leadership, innovative behaviour, and competitive advantage relationship in manufacturing companies: A key to manufactural development and sustainable business. *Sustainability*, 16(6), Article 2407. <https://doi.org/10.3390/su16062407>
- Ertanto, B., Bangun, W., & Tjandrasa, B. B. (2025). Bridging the digital divide: The impact of digital leadership on career commitment with work engagement as a mediator in the hospitality sector. *Journal of Economics, Finance and Management Studies*, 08(01), 405-414. <https://doi.org/10.47191/jefms/v8-i1-37>
- Fan, J., Fan, Y., Yu, L., & Man, S. (2022). How hindrance stress, proactive personality, and the employment relationship atmosphere affect employees' innovative behavior. *Frontiers in Psychology*, 13, Article 969013. <https://doi.org/10.3389/fpsyg.2022.969013>
- Frese, M., & Fay, D. (2001). Personal initiative: An active performance concept for work in the 21st century. *Research in Organizational Behavior*, 23, 133-187. [https://doi.org/10.1016/S0191-3085\(01\)23005-6](https://doi.org/10.1016/S0191-3085(01)23005-6)
- Ghorbani, A., & Bay, N. (2025). The effect of proactive personality on the innovative behaviors of physical education teachers: The mediating role of error management climate formation. *Innovation Management and Operational Strategies*, 6(1), 99-111. <https://doi.org/10.22105/imos.2025.479970.1388>
- Gomez, M. M. (2024). Cultivating creative thinking in the workplace: A positive and open-mind approach. *Thiagarajar College of Preceptors Edu Spectra*, 6(2), 22-26. <https://doi.org/10.34293/eduspectra.v6i2.04>

- Gunawan, R. M. B., & Widodo, W. (2021). Analyzing the effect of knowledge management and teaching creativity on innovative work behavior: The organizational empowerment perspective. *Management Science Letters*, 11(2), 619-626. <https://doi.org/10.5267/j.msl.2020.9.005>
- Hadi, S., Setiawati, L., Kirana, K. C., Lada, S. B., & Rahmawati, C. H. T. (2024). The effect of digital leadership and organizational support on innovative work behavior: The mediating role of emotional intelligence. *QUALITY Access to Success*, 25(199), 74-83. <https://doi.org/10.47750/QAS/25.199.09>
- Hair, J. F., Jr., Babin, B. J., Anderson, R. E., & Black, W. C. (2019). *Multivariate data analysis* (8th ed.). Cengage Learning.
- Hair, J. F., Jr., Sarstedt, M., Ringle, C. M., & Gudergan, S. P. (2023). *Advanced issues in partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). Sage.
- Harvey, S., & Berry, J. W. (2023). Toward a meta-theory of creativity forms: How novelty and usefulness shape creativity. *Academy of Management Review*, 48(3), 504-529. <https://doi.org/10.5465/amr.2020.0110>
- Hassan, R. S., Amin, H. M. G., & Ghoneim, H. (2024). Decent work and innovative work behavior of academic staff in higher education institutions: the mediating role of work engagement and job self-efficacy. *Humanities and Social Sciences Communications*, 11, Article 702. <https://doi.org/10.1057/s41599-024-03177-0>
- Huang, S. Y. B., Huang, C.-H., & Chang, T.-W. (2022). A new concept of work engagement theory in cognitive engagement, emotional engagement, and physical engagement. *Frontiers in Psychology*, 12, Article 663440. <https://doi.org/10.3389/fpsyg.2021.663440>
- Jason, V., & Geetha, S. N. (2021). Regulatory focus and innovative work behavior: The role of work engagement. *Current Psychology*, 40(6), 2791-2803. <https://doi.org/10.1007/S12144-019-00220-1>
- Jyoti, & Kapur, S. (2024). Digital leadership unveiled: Elevating workforce performance and organizational success. *ShodhKosh Journal of Visual and Performing Arts*, 5(5), 267-275. <https://doi.org/10.29121/shodhkosh.v5.i5.2024.3692>
- Kaiyai, H., Kenaphoom, S., & Pommarang, S. (2024). Indicator of the digital leadership skill. In K. Wongmahesak, N. Phongkraphan, & N. Lekhawichit (Eds.), *Consumer and Organizational Behavior in the Age of AI* (pp. 251-270). IGI Global Scientific Publishing. <https://doi.org/10.4018/979-8-3693-8850-1.ch009>
- Karafakioglu, E., & Findikli, M. A. (2024). The mediating role of work engagement in the relationship between digital leadership and innovative behavior and organizational agility. *International Journal of Organizational Leadership*, 13(1), 1-21. <https://doi.org/10.33844/ijol.2024.60396>
- Kaufman, J. C., & Sternberg, R. J. (Eds.). (2019). *Cambridge handbook of creativity* (2nd ed.). Cambridge University Press.
- Khatrri, P., & Dutta, S. (2023). Next generation leadership skill set for Industry 4.0. *International Journal of Public Sector Performance Management*, 11(2), 191-191. <https://doi.org/10.1504/ijpspm.2023.129692>
- Kock, N. (2021). Harman's single factor test in PLS-SEM: Checking for common method bias. *Data Analysis Perspectives Journal*, 2(2), 1-6. <https://bit.ly/4ooCHih>
- Kulachai, W. (2024). Exploring the pathway to innovation: The mediating role of employee engagement in the trust-creativity nexus. *International Review of Public Administration*, 30(1), 1-22. <https://doi.org/10.1080/12294659.2024.2416274>
- Lewaherilla, N. C., Sutrisno, S., Ausat, A. M., & Gadzali, S. (2024). The relationship between intellectual capital, innovative work behavior, and business performance. *Quality Access to Success*, 25(201), 303-311. <https://doi.org/10.47750/QAS/25.201.33>
- Li, Z., Yang, C., Yang, Z., & Zhao, Y. (2024). The impact of middle managers' digital leadership on employee work engagement. *Frontiers in Psychology*, 15, Article 1368442. <https://doi.org/10.3389/fpsyg.2024.1368442>
- Liu, X., Huang, Y., Kim, J., & Na, S. (2023). How ethical leadership cultivates innovative work behaviors in employees? Psychological safety, work engagement and openness to experience. *Sustainability*, 15(4), Article 3452. <https://doi.org/10.3390/su15043452>
- Malik, M., Raziq, M. M., Sarwar, N., & Tariq, A. (2025). Digital leadership, business model innovation and organizational change: Role of leader in steering digital transformation. *Benchmarking: An International Journal*, 32(5), 1632-1662. <https://doi.org/10.1108/BIJ-04-2023-0283>
- Manalo, H. D., Manalo, M. R. T., & Bibangco, E. J. P. (2025). Exploring innovative work behavior to bridge the fragmented knowledge. *Journal of Management World*, 2025(1), 457-466. <https://doi.org/10.53935/jomw.v2024i4.714>

- Martínez, B. M. T., Pérez Fuentes, M. C., & Molero Jurado, M. M. (2024). Work engagement: A descriptive qualitative study on the perception of teachers. *Journal of Qualitative Research in Education/Eğitimde Nitel Araştırmalar Dergisi*, 38, 214-233.
- McMillan, J. H., & Schumacher, S. (2013). *Research in education: Evidence-based inquiry*. Pearson.
- Miao, R., & Cao, Y. (2019). High-performance work system, work well-being, and employee creativity: Crosslevel moderating role of transformational leadership. *International Journal of Environmental Research and Public Health*, 16(9), Article 1640. <https://doi.org/10.3390/ijerph16091640>
- Mollah, M. A., Ibrahim, Al Masud, A., & Chowdhury, M. S. (2024). How does digital leadership boost competitive performance? The role of digital culture, affective commitment, and strategic agility. *Heliyon*, 10(23), Article e40839. <https://doi.org/10.1016/j.heliyon.2024.e40839>
- Moshanah, A. H., Mosavi, F., Almamori, K. J. R., & Karimi, F. (2024). Identification of dimensions and components for developing creative skills. *Journal of Adolescent and Youth Psychological Studies*, 5(10), 82-90. <https://doi.org/10.61838/kman.jayps.5.10.10>
- Mozie, N. M., & Mahadi, N. (2024). Fostering innovative work behavior: Ethical leadership, psychological safety, and proactive personality. *International Journal of Academic Research in Business and Social Sciences*, 14(8), 2145-2152. <https://doi.org/10.6007/ijarbss/v14-i8/22286>
- Mubarak, N., Khan, J., Yasmin, R., & Osmadi, A. (2021). The impact of a proactive personality on innovative work behavior: The role of work engagement and transformational leadership. *Leadership and Organization Development Journal*, 42(7), 989-1003. <https://doi.org/10.1108/LODJ-11-2020-0518>
- Nam, N. K., & Nga, N. T. H. (2024). Influence of personality traits on creativity and IWB of employees. *Problems and Perspectives in Management*, 22(2), 389-398. [https://doi.org/10.21511/ppm.22\(2\).2024.30](https://doi.org/10.21511/ppm.22(2).2024.30)
- Nathaniel, J., & Dewi, Y. E. P. (2024). Innovative work behavior: The role of job crafting and job autonomy mediated by work engagement. *Petra International Journal of Business Studies*, 7(1), 57-65. <https://doi.org/10.9744/petrajbs.7.1.57-65>
- Nerissa, L. E., & Rachmawati, R. (2024). Impact of proactive personality and career adaptability on in-role performance through job crafting and work engagement in Indonesian millennial generation. *Kontigensi: Jurnal Ilmiah Manajemen*, 12(1), 88-97. <https://doi.org/10.56457/jimk.v12i1.519>
- Neuman, W. L. (2021). *Social research methods: Qualitative and quantitative approaches* (8th ed.). Pearson.
- Noroozi, M., Parchami, M., Beyhaghi, S., Armin, S., Goodarzi, S., Takács, E., & Abcouwer, T. (2024). Navigating resistance to technological change in organizations: A holistic approach. *European Conference on Management Leadership and Governance*, 20(1), 425-433. <https://doi.org/10.34190/ecmlg.20.1.3175>
- Ordu, A., & Nayır, F. (2021). What is digital leadership? A suggestion of the definition. *E-International Journal of Educational Research*, 12(3), 68-81. <https://doi.org/10.19160/e-ijer.946094>
- Pajuoja, M., Viitala, R., & Henttonen, K. (2025). Supporting innovating employees: How managerial coaching affects four dimensions of innovative work behavior. *Review of Managerial Science*, 19, 2937-2958. <https://doi.org/10.1007/s11846-025-00837-6>
- Peng, J.-C., & Chen, C.-M. (2023). Linking proactive personality to proactive customer-service performance: A moderated parallel mediation model. *Humanities and Social Sciences Communications*, 10, Article 700. <https://doi.org/10.1057/s41599-023-02219-3>
- Putra, I. K. S. W., Riana, I. G., & Surya, I. B. K. (2020). The influence of authentic leadership and work engagement over innovative work behavior. *Journal of Multidisciplinary Academic*, 4(5), 295-299. <https://bit.ly/4mH5gpZ>
- Roman, A. V., Van Wart, M., Wang, X., Liu, C., Kim, S., & McCarthy, A. (2019). Defining e-leadership as competence in ICT-mediated communications: An exploratory assessment. *Public Administration Review*, 79(6), 853-866. <https://doi.org/10.1111/puar.12980>
- Salsabila, Z. H., & Mansyur, A. (2024). Innovative work behavior: Role of organizational climate and employee creativity. *Jurnal Fokus Manajemen Bisnis*, 14(1), 71-83. <https://doi.org/10.12928/fokus.v14i1.9491>
- Sari, D. K., Yudiarto, A., & Sinambela, F. C. (2021). Work engagement and innovative work behavior: Meta-analysis study. In I. F. Kristiana, C. G. Widayanti, A. R. Prasetyo, Z. Al Faruqi, T. L. Pertiwi, K. U. Sholihah, A. Puspitasari, & S. Rizkizen (Eds.), *Proceedings of the International Conference on Psychological Studies (ICPSYCHE 2020)* (Vol. 530, No. 53, pp. 359-366). Atlantis Press. <https://doi.org/10.2991/ASSEHR.K.210423.053>

- Sarstedt, M., Ringle, C. M., & Hair, J. F. (2022). Partial least squares structural equation modeling. In C. Homburg, M. Klarmann, & A. E. Vomberg (Eds.), *Handbook of Market Research* (pp. 587-632). Springer. https://doi.org/10.1007/978-3-319-57413-4_15
- Schaufeli, W. B., & Bakker, A. B. (2010). Defining and measuring work engagement: Bringing clarity to the concept. In A. B. Bakker (Ed.) & M. P. Leiter, *Work engagement: A handbook of essential theory and research* (pp. 10-24). Psychology Press.
- Sebetci, Ö., Çavuş, M. N., & Çavuş, B. (2025). Examining the impact of digital leadership on innovative work behavior and knowledge sharing behavior through psychological ownership. *International Journal of Sociotechnology and Knowledge Development*, 17(1), 1-15. <https://doi.org/10.4018/IJSKD.378388>
- Setiyawami, S., Setyawati, A., Lestari, D. S., Wakhyuni, E., & Syamsuddin, S. (2023). Innovative work behavior analysis of msme employees: The role of creative self-efficacy, organizational culture and psychological empowerment as predictors. *Sultanist : Jurnal Manajemen dan Keuangan*, 11(1), 45-57. <https://doi.org/10.37403/sultanist.v11i1.480>
- Shahbaz, M. H., Naseem, M. A., Battisti, E., & Alfiero, S. (2024). The effect of green intellectual capital and innovative work behavior on green process innovation performance in the hospitality industry. *Journal of Intellectual Capital*, 25(2/3), 402-422. <https://doi.org/10.1108/JIC-02-2023-0034>
- Siregar, K. E., & Akhter, N. (2025). Digital leadership in the era of Industry 4.0: A comprehensive literature review. *International Journal of Educational Evaluation and Policy Analysis*, 1(3), 30-41. <https://doi.org/10.62951/ijeepa.v1i3.36>
- Sonnentag, S. (2017). A task-level perspective on work engagement: A new approach that helps to differentiate the concepts of engagement and burnout. *Burnout Research*, 5, 12-20. <https://doi.org/10.1016/j.burn.2017.04.001>
- Suendarti, M., Widodo, W., & Hasbullah, H. (2020). Demonstrating the effect of grit and creativity on innovative behavior of teacher's natural science: Mediating by self-efficacy. *Journal of Xi'an University of Architecture and Technology*, 12(6), 470-478. <http://bit.ly/3JaamNc>
- Susanti, S., & Ardi, A. (2022). The effect of digital transformational leadership, creative self-efficacy on innovative behaviour mediated by perceived organizational support. *JlIP - Jurnal Ilmiah Ilmu Pendidikan*, 5(8), 3111-3120. <https://doi.org/10.54371/jlup.v5i8.802>
- Tawar, M. S., & Syahrizal, S. (2025). The effect of proactive personality and entrepreneurial leadership on innovative work behavior mediated by work engagement in state civil apparatus at the Cooperative Service in West Sumatera. *Journal of Economics, Finance and Management Studies*, 8(01), 231-252. <https://doi.org/10.47191/jefms/v8-i1-21>
- Tekeli, M., & Özkoç, A. G. (2022). The effect of proactive personality and locus of control on innovative work behavior: The mediating role of work engagement. *Anais Brasileiros de Estudos Turísticos*, 12, 1-12. <https://doi.org/10.5281/zenodo.5821836>
- Turan-Torun, B., Oktaysoy, O., Kobanoglu, M. S., Topcuoglu, E., Yenikaya, M. A., Topcuoglu, V., & Uygungil-Erdogan, S. (2025). Identification of heavy work investment antecedents: A research on digital leadership. *Frontiers Psychology*, 16, Article 1588412. <http://dx.doi.org/10.3389/fpsyg.2025.1588412>
- Ullah, I., Hameed, R. M., & Mahmood, A. (2024). The impact of proactive personality and psychological capital on innovative work behavior: Evidence from software houses of Pakistan. *European Journal of Innovation Management*, 27(6), 1967-1985. <https://doi.org/10.1108/EJIM-01-2022-0022>
- Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, 28(2), 118-144. <https://doi.org/10.1016/j.jsis.2019.01.003>
- Wang, Z., Yang, L., Zhu, Y., Tang, X., Wang, T., Chen, L., Li, L., Xie, W., Peng, J., Yang, J., Long, Q., Lu, F., Wang, Y., Shen, H., Yin, J., Zhan, X., & Zhou, H. (2024). Innovative behavior and structural empowerment among the Chinese clinical nurses: The mediating role of decent work perception. *BMC Nursing*, 23, Article 881. <https://doi.org/10.1186/s12912-024-02554-z>
- Weber, E., Büttgen, M., & Bartsch, S. (2022). How to take employees on the digital transformation journey: An experimental study on complementary leadership behaviors in managing organizational change. *Journal of Business Research*, 143, 225-238. <https://doi.org/10.1016/j.jbusres.2022.01.036>
- Westerman, G., Bonnet, D., & McAfee, A. (2014). *Leading digital: Turning technology into business transformation*. Harvard Business Press.
- Widodo. (2018). *Metodologi penelitian: Populer & praktis* [Research methodologies: Popular & practical]. RajaGrafindo Persada.

- Widodo, W., Damanik, J., Bastian, A., Chandrawaty, C., & Sariyo, H. (2024). How cultural intelligence-based principal leadership affects teacher task performance: the mediating role of organizational culture and school governance. *Journal of Intercultural Communication*, 24(2), 172-185. <https://doi.org/10.36923/jicc.v24i2.292>
- Wirawan, H., Samad, M. A., & Khairil, M. (2024). Investigating the effect of abusive supervision on work engagement through the role of employee creativity: The moderating effect of interpersonal communication competence. *Human Resource Development International*, 27(1), 36-57. <https://doi.org/10.1080/13678868.2023.2193809>
- Wong, C. D., & Jonathan, V. (2024). The mediating role of proactive personality in the relationship between new ways of working (NWOW) and work engagement. *International Journal of Academic Research in Business and Social Sciences*, 14(10), 179-193. <https://doi.org/10.6007/ijarbss/v14-i10/22878>
- Wu, Y. J., Wu, C.-H., & Peng, K.-L. (2025). Effects of creativity styles on learning engagement and motivation in STEAM education. *Sustainability*, 17(6), Article 2755. <https://doi.org/10.3390/su17062755>
- Yang, C., Li, Z., Li, F., & Li, H. (2024). The impacts of digital leadership on employee voice behaviors: The mediating roles of employee empowerment and work engagement. *SAGE Open*, 14(2), 1-15. <https://doi.org/10.1177/21582440241260474>
- Yeap, S. B. (2024). Did ethical leadership help to increase academic staff's innovative work behavior? The mediating role of intrinsic motivation and proactive personality. *Current Psychology*, 43, 9625-9637. <https://doi.org/10.1007/s12144-023-04960-z>
- Zahra, M., & Kee, D. M. H. (2022). Influence of proactive personality on job performance of bank employees in Pakistan: Work engagement as a mediator. *International Journal of Management Studies*, 29(1), 83-108.
- Zaidi, A., Malik, F., & Iqbal, S. (2024). Effect of creative leadership on innovative work behavior mediated by employee creativity and innovative culture in advertising and media industry. *Human Nature Journal of Social Sciences*, 5(4), 190-206. <https://doi.org/10.71016/hnjss/66763987>
- Zargar, P., Daouk, A., & Chahine, S. (2025). Driving innovative work behavior among university teachers through work engagement and perceived organizational support. *Administrative Sciences*, 15(7), Article 246. <https://doi.org/10.3390/admsci15070246>
- Zehir, C., & Öztürk, H. Y. (2023). The effect of innovative work behavior and strategic flexibility on business innovativeness: An empirical analysis. *Journal of Global Strategic Management*, 17(1), 17-25. <https://doi.org/10.20460/jgsm.2023.322>
- Zhang, W., Xu, F., & Wang, X. (2020). How green transformational leadership affects green creativity: Creative process engagement as intermediary bond and green innovation strategy as boundary spanner. *Sustainability*, 12(9), Article 3841. <https://doi.org/10.3390/su12093841>
- Zhang, Y. (2025). The impact of workplace exercise on employee innovative behavior: The mediating roles of vitality and creativity. *International Journal of Science and Business*, 43(1), 83-93. <https://doi.org/10.58970/ijsb.2518>
- Zhi, R., & Wang, Y. (2025). Exploring the interplay between well-being, mindfulness, creativity, and work engagement among EFL teachers. *Thinking Skills and Creativity*, 56, Article 101697. <https://doi.org/10.1016/j.tsc.2024.101697>
- Zhu, J., Zhang, B., Xie, M., & Cao, Q. (2022). Digital leadership and employee creativity: The role of employee job crafting and person-organization fit. *Frontiers in Psychology*, 13, Article 827057. <https://doi.org/10.3389/fpsyg.2022.827057>
- Zia, A., Memon, M. A., Mirza, M. Z., Iqbal, Y. M. J., & Tariq, A. (2025). Digital job resources, digital engagement, digital leadership, and innovative work behaviour: A serial mediation model. *European Journal of Innovation Management*, 28(8), 3192-3216. <https://doi.org/10.1108/EJIM-04-2023-0311>